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XLV.—*On the Advantage of a Dominant Language for Science.*

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AT the period of the Renaissance Latin was the language employed by all the learned men of Europe. It had been carefully preserved by the Romish Church; and not one of the modern languages presented, at that time, a sufficiently rich literature to become its rival. But at a later period the Reformation disturbed the unity of the Romish influence. Italian, Spanish, French, and English gained successively regular idioms, and became rich in literary productions of every kind; and at last, 80 or 100 years ago at most, the progress of science caused the inconvenience of the use of Latin to be felt. It was a dead language, and, in addition to that, was wanting in clearness, owing to its inversions, to its abbreviated words, and to the absence of articles. There existed at that time a general desire to describe the numerous discoveries that were being made, and to explain and discuss them without the necessity of seeking for words. The almost universal pressure of these causes was the reason for the adoption of modern languages in most sciences, natural history being the only exception: for this Latin is still employed, but only in descriptions—a special and technical part, where the number of words is limited and

* The fifth chapter of the '*Histoire des Sciences et des Savants depuis deux siècles*,' 8vo, Genève, 1873: London, Dulau. Translated by Miss Miers, by permission of the author.

the construction very regular. Speaking truly, what naturalists have preserved is the Latin of Linnæus, a language in which every word is precise in meaning, every sentence arranged logically, clearly, and in a way employed by no Roman author. Linnæus was not a linguist: he knew but little even of modern languages; and it is evident that he struggled against many difficulties when he wrote in Latin. With a very limited vocabulary and a turn of mind which revolted equally from the periods of Cicero and the reticence of Tacitus, he knew how to create a language precise in its terms, appropriate to the description of forms, and intelligible to students. He never made use of a term without first defining it. To renounce this special language of the learned Swede would be to render descriptions less clear and less accessible to the *savans* of all nations. If we attempt to translate into the Latin of Linnæus certain sentences in modern Floras, written in English or German, we quickly perceive a want of clearness. In English the word *smooth* applies equally to *glaber* and *levis* *. In German the construction of sentences indicating generic or other characters is sometimes so obscure that I have found it impossible, in certain cases, to have them put into Latin by a German, a good botanist, who was better acquainted than myself with both languages. It would be still worse if authors had not introduced many words, purely Latin, into their language. But, exclusive of paragraphs relative to characters, and wherever successive phenomena or theories are in question, the superiority of modern languages is unquestionable; it is on this account that, even in natural history, Latin is every day less employed.

The loss, however, of the link formerly established between scientific men of all countries has made itself felt. From this has arisen a very chimerical proposal to form some artificial language, which should be to all nations what writing is to the Chinese. It was to be based on ideas, not words. The problem has remained quite devoid of solution; and even were it possible, it would be so complicated an affair, so impracticable and inflexible, that it would quickly drop into disuse.

The wants and the circumstances of each epoch have brought about a preference for one or other of the principal European languages as a means of communication between enlightened men of all countries. French rendered this service during two centuries. At present various causes have modified the

[* The word *glaber* in botany means bald, or not hairy, which is applied to other parts as well as the head; and *levis* smooth, not rough; but I know they have both been carelessly translated "smooth," as M. de Candolle implies.—J. E. G.]

use of this language in other countries, and the habit has been almost everywhere introduced that each nation should employ its own tongue. We have therefore entered upon a period of confusion. What is thought to be new in one country is not so to those who read books in other languages. It is vain to study living languages more and more ; you are always behind-hand in the complete knowledge of what is being published in other countries. Few persons are acquainted with more than two languages ; and if we try to pass beyond a certain limit in this respect, we rob ourselves of time for other things ; for there is a point at which the study of the means of knowledge hinders our learning. Polyglott discussions and conversations do not answer the intentions of those who attempt them. I am persuaded that the inconvenience of such a state of things will be more and more felt. I also believe, judging by the example of Greek as used by the Romans, and French in modern times, that the need of a prevailing language is almost always recognized ; it is returned to from necessity after each period of anarchy. To understand this we must consider the causes which make a language preferable, and those which spread its employment in spite of any defects it may possess.

Thus in the 17th and 18th centuries motives existed for the employment of French in preference to Latin throughout Europe. It was a language spoken by the greater part of the educated men of the period, a language tolerably simple and very clear. It had an advantage in its resemblance to Latin, which was then widely known. An Englishman, a German, was already half acquainted with French through his knowledge of Latin ; a Spaniard, an Italian, was three parts advanced in his study of the language. If a discussion were sustained in French, if books were written or translations made in the language, all the world understood.

In the present century civilization has much extended north of France, and population has increased there more than to the south. The use of the English tongue has been doubled by its extension into America. The sciences are more and more cultivated in Germany, in England, in the Scandinavian countries, and Russia. The scientific centre of gravity has advanced from the south towards the north.

Under the influence of these new conditions a language can only become predominant by presenting two characters : 1st, it must possess sufficient German and Latin words or forms to be within reach at once of the Germans and of the people who make use of Latin tongues ; 2nd, it must be spoken by a considerable majority of civilized people. In addition to these two essential conditions it would be well for the definitive

success of a language that it should also possess the qualities of grammatical simplicity, of conciseness, and clearness.

English is the only language which may, in fifty or a hundred years, offer all these conditions united.

The language is half German and half Latin. It possesses German words, German forms, and also French words and a French method of constructing sentences. It is a transition between the principal languages used at present in science, as French was formerly between Latin and several of the modern languages.

The future extension of the Anglo-American tongue is evident. It will be rendered inevitable by the movement of the populations in the two hemispheres. Here is the proof, which it is easy to give in a few words and a few figures.

At the present time the population stands thus (Almanach de Gotha, 1871) * :—

English-speaking peoples—in England 31 millions, in the United States 40, in Canada &c. 4, in Australia and New Zealand 2 : total 77.

German-speaking peoples—in Germany and a portion of Austria 60, in Switzerland (German cantons) 2 : total 62.

French-speaking peoples—in France $36\frac{1}{2}$, in Belgium (French portion) $2\frac{1}{2}$, in Switzerland (French cantons) $\frac{1}{2}$, in Algeria and the Colonies 1 : total $40\frac{1}{2}$.

Now, judging by the increase that has taken place in the present century, we may estimate the probable growth of population as follows † :—

	millions.
In England it doubles in 50 years; therefore in a century (in 1970) it will be	124
In the United States, in Canada, in Australia, it doubles in 25 ; therefore it will be	736
Probable total of the <i>English</i> -speaking race in 1970 .	860

In Germany the northern population doubles in 56 to 60 years, that of the south in 167 years. Let us suppose 100 years for the average. It will probably be in 1970, for the countries of German speech, about . 124

In the French-speaking countries the population doubles in about 140 years. In 1970, therefore, it will probably amount to $69\frac{1}{2}$

[* No notice is here taken of the English-speaking people in India and the East.—J. E. G.]

† Almanach de Gotha, 1870, p. 1039.

Thus the three principal languages spoken at the present time will be spoken a century hence with the following progression :—

	millions.
The English tongue will have increased from 77 to 860	
The German " " "	from 62 to 124
The French " " "	from 40½ to 69½

The individuals speaking German will form a seventh part, and those speaking French a twelfth or thirteenth part of those of English tongue; and both together will not form a *quarter* of the individuals speaking English. The German or French countries will then stand towards those of English speech as Holland or Sweden do at present with regard to themselves. I am far from having exaggerated the growth of the Anglo-Australian-American populations. Judging by the surface of the countries they occupy, they will long continue to multiply in large proportion. The English language is, besides, more diffused than any other throughout Africa and Southern Asia. America and Australia are not, I confess, countries in which the culture of letters and sciences is so much advanced as in Europe; and it is probable that, for a length of time, agriculture, commerce, and industry will absorb all the most active energies. I acknowledge this. But it is no less a fact that so considerable a mass of intelligent and educated men will weigh decisively on the world in general. These new peoples, English in origin, are mingled with a German element, which, in regard to intellectual inclinations, counterbalances the Irish. They have generally a great eagerness for learning and for the application of discoveries. They read much. Works written in English or translated into that tongue would, in a vast population, have a very large sale. This would be an encouragement for authors and translators that is offered by neither the French nor the German language. We know in Europe to what degree difficulties exist in the publication of books on serious subjects; but open an immense mart to publishers, and works on the most special subjects will have a sale. When translations are read by ten times as many people as at present, it is evident that a greater number of books will be translated; and this will contribute in no small degree towards the preponderance of the English language. Many French people already buy English translations of German books, just as Italians buy translations in French. If English or American publishers would adopt the idea of having translations made into their language of the best works that appear in Russian, Swedish, Danish, Dutch,

&c., they would satisfy a public dispersed over the whole world, and particularly the numerous Germans who understand English. Yet we are but at the beginning of the numerical preponderance of the English-speaking populations.

The nature of a language does not, at first sight, appear to have very great influence on its diffusion. French was preferred for two centuries; and yet Italian was quite as clear, more elegant, more harmonious, had more affinity with Latin, and, for a length of time, had possessed a remarkable literature. The number, the activity of the French, and the geographical position of their country were the causes of their preponderance. Yet the qualities of a language, especially those preferred by the moderns, are not without their influence. At the present time briefness, clearness, grammatical simplicity are admired. Nations, at least those of our Indo-European race, began by speaking in an obscure complicated manner; in advancing they have simplified and made their language more precise. Sanscrit and Basque, two very ancient languages, are exceedingly complicated. Greek and Latin are so in less degree. The languages derived from Latin are clothed in clearer and simpler forms. I do not know how philosophers explain the phenomenon of the complication of language at an ancient period; but it is unquestionable. It is more easy to understand the subsequent simplifications. When a more easy and convenient method of acting or speaking has been arrived at, it is naturally preferred. Besides, civilization encourages individual activity; and this necessitates short words and short sentences. The progress of the sciences, the frequent contact of persons speaking different languages, and who find a difficulty in understanding each other, lead to a more and more imperious need for clearness. You must have received a classical education to avoid the perception of absurdity in the construction of an ode of Horace. Translate it literally to an uneducated workman, keeping each word in its place, and it will have to him the effect of a building the entrance-door of which is on the third story. It is no longer a possible language, even in poetry.

Modern languages have not all, to the same degree, the advantages now demanded, of clearness, simplicity, and briefness.

The French language has shorter words and less complicated verbs than the Italian: this, in all probability, has contributed to its success. The German has not undergone the modern evolution by which each sentence or portion of a sentence begins with the principal word. Words are also cut in two and the fragments dispersed. It has three genders, whereas

French and Italian have but two. The conjugations of many verbs are rather complicated. Nevertheless modern tendencies weigh with the Germans, and it is evident that their language is becoming a little modified. Scientific authors especially exert themselves to attempt the direct modes of expression and the short phrases of other countries, in the same way that they have abandoned the Gothic printed letters. Should they correspond with strangers, they often have the politeness to write in Latin characters. They willingly introduce in their publications terms taken from foreign languages, modifications sometimes merely of form, occasionally fundamental. These attest the modern spirit and the enlightened judgment of the learned men so numerous in Germany. Unhappily the modifications of form have no great importance, and the fundamental changes take place very slowly.

The more practical English language shortens sentences and words. It willingly takes possession of foreign words, as German does ; but of *cabriolet* it makes *cab*, of *memorandum* it makes *mem*. It makes use only of indispensable and natural tenses—the present, the past, the future, and the conditional. There is no arbitrary distinction of genders : animated objects are masculine or feminine ; the others are neuter. The ordinary construction is so sure to begin with the principal idea that in conversation you may often dispense with the necessity of finishing your sentences. The chief fault of the English language, its inferiority in comparison with German or Italian, consists in an orthography absolutely irregular, and so absurd that children take a whole year in learning to read *. The pronunciation is not well articulated, not well defined. I shall not go as far as Madame Sand in her amusing imprecations on this point ; but there is truth in what she says. The vowels are not distinct enough. But, in spite of these faults, English, according to the same clever writer, is a well-expressed language, quite as clear as any other, at least when English people choose to revise their MSS., which they will not always do ; they are in such a hurry !

English terms are adapted to modern wants. Do you wish to hail a vessel, to cry “stop” to a train, to explain a machine, to demonstrate an experiment in physics, to speak in few words to busy and practical people, it is the language *par excellence*. In comparison with Italian, with French, and, above all, with

* Surprised, on one occasion, by the slowness with which intelligent English children learnt reading, I inquired the reason. Each letter has several sounds, or you may say that each sound is written in several ways. It is therefore necessary to learn reading word for word. It is an affair of memory.

German, English has the effect, to those who speak several languages, of offering the shortest cut from one point to another. I have observed this in families where two languages are equally well known, which often occurs in Switzerland. When the two languages are German and French, the latter almost always carries the day. "Why?" I asked of a German Swiss established in Geneva. "I can scarcely tell you," he replied; "at home we speak German to exercise my son in the language; but he always falls back into the French of his comrades. French is shorter, more convenient." Before the events of 1870, a great Alsatian manufacturer sent his son to study at Zurich. I was curious to know the reason why. "We cannot," he said, "induce our children to speak German, with which they are quite as familiar as with French. I have sent my son to a town where nothing but German is spoken, in order that he may be forced to speak it." In such preferences you must not look for the causes in sentiment or fancy. When a man has choice of two roads, one straight and open, the other crooked and difficult to find, he is sure to take, almost without reflection, the shorter and more convenient one. I have also observed families where the two languages known in the same degree were English and French. In this case the English maintained supremacy, even in a French-speaking land. It is handed down from one generation to another; it is employed by those who are in haste, or who want to say something in as few words as possible. The tenacity of French or English families established in Germany in speaking their own language, and the rapid disappearance of German in the German families established in French or English countries, may be explained by the nature of the languages rather than by the influence of fashion or education.

The general rule is this:—In the conflict of two languages, every thing else being equal, it is the most concise and the most simple that conquers. French beats Italian and German; English beats the other languages. In short, it need only be said that the more simple a language is, the more easy it is to be learnt, and the more quickly can it be made available for profitable employment.

The English language has another advantage in family use: its literature is the one most suitable to feminine tastes; and every one knows how great is the influence of mothers on the language of children. Not only do they teach what is called "the mother tongue," but often, when well educated, they feel pleasure in speaking a foreign language to their children. They do so gaily, gracefully. The young lad who finds his

language-master heavy, his grammar tiresome, thinks very differently when his mother, his sister, or his sister's friend addresses herself to him in some foreign tongue. This will often be English—and for the best of reasons: there is no language so rich in works (written in a spirit of true morality) upon subjects which are interesting to women—religion, education, fiction, biography, poetry, &c.

The future preponderance of the language spoken by English, Australians, and Americans thus appears to me assured. The force of circumstances leads to this result; and the nature of the language itself must accelerate the movement.

The nations who speak the English tongue are thus burthened with a responsibility which it is well they should recognize at once. It is a moral responsibility towards the civilized world of the coming centuries.

Their duty, as it is also their interest, is to maintain the present unity of the language, at the same time admitting the necessary or convenient modifications which may arise under the influence of eminent writers, or be arranged by common consent. The danger to be feared is that the English language may, before another century has passed, be broken up into three languages, which would be in the same relation to each other as are Italian, Spanish, and Portuguese, or as Swedish and Danish.

Some English authors have a mania for making new words. Dickens has invented several. Yet the English language already possesses many more words than French, and the history of its literature shows that there is greater need to suppress than to add to the vocabulary. No writer for three centuries past has employed nearly so many different words as Shakspeare; therefore there must have been many unnecessary ones. Probably every idea and every object had formerly a term of Saxon origin and one of Latin or French origin, without counting Celtic or Danish words. The very logical operation of time has been to suppress the double or triple words. Why reestablish them? A people so economical in its use of words does not require more than one term for each thing*.

The Americans, on the other hand, make innovations of accent or orthography (they almost always spell *labour* "labor," and *harbour*, "harbor"). The Australians will do the same if they do not take care. Why should not all possess the noble am-

* A clever English writer has just published a volume on the institutions of the people called *Swiss* in English. He names them *Switzers*. For what reason? Will there soon be *Deutschers*?

bition of giving to the world one uniform concise language, supported by an immense literature and spoken in the next century by 800 or 1000 millions of civilized men? To other languages it would be as a vast mirror in which each would become reflected, thanks to newspapers and translations, and all the friends of intellectual culture would have a convenient medium for the interchange of ideas. It would be rendering an immense service to future races; and at the same time the authors and men of science of English-speaking race would give a strong impulsion to their own ideas. The Americans, above all, are interested in this stability, since their country is to be the most important of those of English tongue. How can they acquire a greater influence over Old England than by speaking her language with exactness?

The liberty of action permitted amongst people of English race adds to the danger of a division in the language. Happily, however, certain causes which broke up the Latin language do not exist for English nations. The Romans conquered nations the idioms of which were maintained or reappeared here and there in spite of administrative unity. The Americans and Australians, on the contrary, have before them only savages, who disappear without leaving any trace. The Romans were conquered and dismembered in their turn by the barbarians. Of their ancient civilization no evidence of unity remained, unless it was in the Church, which has itself felt the influence of the universal decline. The Americans and Australians possess many flourishing schools; they have the literature of England as well as their own. If they choose, they can wield their influence by means of maintaining the unity of the language. Certain circumstances make it possible for them to do so; thus the teachers and professors mostly come from the States of New England. If these influential men truly comprehend the future destiny of their country, they will use every effort to transmit the language in its purity; they will follow classic authors and discard local innovations and expressions. In this question of language, real patriotism (or, if you will, the patriotism of Americans really ambitious for their country) ought to be to speak the English of Old England, to imitate the pronunciation of the English, and to follow their whimsical orthography until changed by themselves. Should they obtain this of their countrymen, they would render to all nations and to their own an unquestionable benefit for futurity.

The example of England proves the influence of education upon the unity of a language. It is the habitual contact of

educated people and the perusal of the same books which, little by little, is causing the disappearance of Scotch words and accent. A few years more, and the language will be uniform throughout Great Britain. The principal newspapers, edited by able men, also exercise a happy influence in preserving unity. Whole columns of 'The Times' are written in the language of Macaulay and Bulwer, and are read by millions of people: the result is an impression which maintains the public mind in a proper literary attitude.

In America the newspaper articles are not so well written; but the schools are accessible to all classes, and the universities count amongst their professors men especially accomplished in their use of the English tongue. If ever there should arise a doubt in the opinions of the two countries as to the advisability of modifying the orthography, or even making changes in the language, it would be an excellent plan to organize a meeting of delegates from the principal universities of the Three Kingdoms, of America, and Australia, to propose and discuss such changes. Doubtless they would have the good sense to make as few innovations as possible; and, thanks to common consent, the advice would probably be followed. A few modifications in the orthography alone would render the English language more easy to strangers, and would contribute towards the maintenance of unity in pronunciation throughout Anglo-American countries.

Notes by Dr. J. E. GRAY.

It may be observed, in addition, that the people who use the English language in different parts of the world are a reading and book-buying people, and especially given to the study of scientific or quasi-scientific books, as is proved by the fact of the extensive sale which they command.

In support of this assertion I may quote the Baron Férussac's review of Wood's '*Index Testaceologicus*,' in the *Bull. Sci. Nat. Paris*, 1829, p. 375. He remarks:—

"We observe with interest the number of subscribers that exist in England for an octavo volume on shells, costing 186 francs. It is a curious fact, which booksellers and authors will appreciate, as it will afford them the means of seeing how a return is obtained for their outlay on such works in England, compared with other countries. The number of subscribers is 280, of which 34 are females and 6 foreigners. Certainly all the rest of Europe could not produce as many, nor perhaps even the half of that number."

How much more astonished would M. Férussac have been, if informed that these were only the subscribers before publication, and that 1000 copies were sold! Since 1829 the sale of scientific books has much increased, as is shown, for example, by the many editions of the works of Lyell and other naturalists, each edition being of 1000 copies.

Most scientific books in France and other continental countries can only be published when the Government furnishes the cost; and they are chiefly published in an expensive form as a national display, and are almost confined to their public libraries, except the sale of copies that are bought by English collectors.

In England such works are generally published by individual enterprise, and depend on the general public for their support, and are published in a style to suit the different classes. Thus there are works of luxury for the rich, often published by individuals who confine themselves to the production of that class of books, very cheap works for the student and mechanic, and books of all intermediate grades, produced by the regular publishers. The females of all grades are extensive readers of this class of books, which I believe is chiefly the case with English-speaking races.

Some of the scientific Swedes and Russians have published their papers in the English language, or appended an abstract in English to them, as Thorell on European spiders, Prof. Lilljeborg on *Lysianassa*, and Prof. Wackerbarth on the planet Leda, &c. &c. The Danes and Dutch often publish *their* scientific papers in French, as Temminck, Reinhardt, and the late Prof. Van der Hoeven, who themselves read and write English; but it appears they regard French as the polite language of courts, and forget that courtiers generally have a contempt for science and that they should look among the people for their readers.

It is to be observed that Professor de Candolle himself uses the French language with a very English construction; but we believe that his work would have commanded the greatest number of readers if written in the English language, which he reads and writes so fluently.

See also Mr. Galton's interesting article on the Causes which create Scientific Men, in the 'Fortnightly Review' for March 1873, p. 346, which contains some interesting observations on M. de Candolle's work.